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ABSTRACT

Awareness of the presence of sexual double entendres within a word association test was investigated with measures of response time, verbal content of responses, and videotaped facial expressions. Subjects characterized as internal-field independent were found to become aware earlier in the task, to test out their developing hypothesis about the list, to become more mirthful, and less puzzled as the task progressed than their more external counterparts. Various interactions often indicated the greatest difference between external-field dependent subjects and all other groups, though other differences were also frequently found. More extensive cognitive processes are therefore attributed to internal individuals, which, in turn, is used to explain their greater independence from social demands. (Author)

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Cognitive Activity and Hypothesis Formation During a Double Entendre Word Association Test as a Function of Locus of Control and Field Dependence[1]

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Through a near decade of research with the locus of control construct, an assumption has been maintained to the effect that persons who hold internal control expectancies are more active in managing their lives than are persons who hold external control expectancies. In support of this contention, internals, those persons who generally attribute causality to themselves, have been found more ready to participate in action aimed at ameliorating social conditions (Gore & Rotter, 1963; Strickland, 1965), and to be more deliberate about their actions in tasks requiring skill than have externals, those persons who believe that their own behavior and resulting outcomes are unrelated (Rotter & Mulry, 1965; Lefcourt, Lewis, & Silverman, 1968; Julian & Katz, 1968). The earlier research documenting these findings with locus of control has been reviewed extensively elsewhere (Rotter, 1966; Lefcourt, 1966).

Most pertinent to the present investigation are those studies which have reported a relationship between locus of control and activity in the sphere of cognitive processes. Internal persons have been found to possess more information than externals regarding the maintenance of their health after being

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institutionalized with tuberculosis (Seeman, 1963), and to learn more information about obtaining parole when inmates in a reformatory (Seeman & Evans, 1962). Internals have been found to be more aware than externals of challenges inherent in achievement tasks (Lefcourt, 1967) and to be more ready than externals to search for and to use information necessary for the successful handling of experimental tasks (Davis & Phares, 1967; Phares, 1968; Lefcourt & Wine, 1969). In most of these preceding investigations then, internals more than externals, have been found to be cognitively active in their search for and learning of relevant information for understanding the events in which they have been engaged.

A complementary series of findings have been reported to the effect that internal persons resist influence, whereas externals appear to be more easily directed by instructions (Lefcourt, 1967; Lefcourt & Wine, 1969), by social pressure (Johnson, Ackerman, Frank, & Fionda, 1968), and by social reinforcements (Gore, 1963; Getter, 1966; Strickland, 1970). The source of such resistance to external manipulation has been ascribed to the assumed greater cognitive activity of internals. When confronted with external demands, internals seem more likely to refer to inner standards for judging the acceptability of those demands than to external definitions of the same. This "referral" could consist of an internal dialogue, if verbal, or simply a more extensive information processing procedure consisting of more comparisons

with past experiences. Either of these processes would leave the internal individual less susceptible to the immediate stimulation in his milieu if only through the time delay incurred by these internal operations. This lesser responsivity to external stimuli and greater reliance upon inner promptings and standards of judgment is analogous to that which differentiates between thin and obese individuals, who have been described as internally and externally controlled (Schachter, 1971).

Despite this apparent convergence of results favoring the assumption of greater cognitive activity among internals than externals, studies exploring awareness of reinforcement contingencies in verbal conditioning studies have failed to confirm this assumption (Getter, 1966; Strickland, 1970). Additional reason for caution regarding the assumed alertness superiority of internal individuals derives from the type of data from which such inferences have been drawn. Often such conclusions have been based upon a rather restricted type of response such as whether or not a subject chooses to ask for more information (Davis & Phares, 1967); or have been inferred from such phenomena as the resistance to follow somewhat dubious verbal instructions (Lefcourt et al., 1968).

The current investigation was designed in the hope of providing more definitive data regarding cognitive activity differences between persons with internal versus external control orientations. It follows in sequence a series of three studies

exploring cognitive characteristics and the locus of control. In addition, because the field dependence variable has behavioral referents which bear close similarity to that of locus of control it has been simultaneously explored (Witkin, Dyk, Paterson, Goodenough, & Karp, 1962). Previous investigations have reported no direct relationship between locus of control and field dependence (Deever, 1967; Rotter, 1966). However, the two variables have predicted to similar criteria such as ascribed assertiveness of TAT characters (Bax, 1966), reliance upon one's own reinforcement history as opposed to other's norms (Deever, 1967), and response to autonomy in reaction time tasks (Lefcourt & Siegel, 1970a,b).

In the latter reaction time experiments, externals and field dependent subjects were found to be so rapid in their responses that the authors were led to suggest that "external subjects can become almost automaton respondents, seeming to behave with little or no interference from cognitive mediators or other inhibitory mechanisms."

Lefcourt and Telegdi (1971) then investigated performance on a series of cognitive measures, the Remote Associates Test (RAT-Mednick & Mednick, 1967), an inkblot, and incomplete sentences test with locus of control and field dependence as predictor variables. As hypothesized, internal-field independent subjects scored most highly on each of four measures related to cognitive activity though external-field dependent subjects were not the least

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adequate. Rather, the incongruous pairings, external-field independent and internal-field dependent, scored lowest on each index, indicating a lesser degree of cognitive fluidity and expressiveness than either of the congruent groups.

The present study investigates the ongoing process of hypothesis formation as subjects confront a task which contains a gradually increasing number of dissonant elements that alter the apparent meaning of the experiment. The hypotheses are that internal-field independent subjects will provide evidence of an earlier awareness of the dissonant elements, and will manifest signs of attitude change toward the task earlier than will other subjects. The exact ordering among the other groups is not predicted with great confidence since previous experimentation (Lefcourt & Telegdi, 1971) did not reveal a clear linearity from internal-field independence to external-field dependence. Nevertheless, it is hypothesized that the more consistently internal the individual, as measured by locus of control and field dependence, the more likely is that individual to exhibit signs of "catching on" to the surreptitious nature of the experiment.

Method

Subjects

The S sample consisted of 65 male undergraduates drawn from Introductions to Psychology and Personality Research courses at the University of Waterloo. Participation was required in both courses. All Ss had completed the Internal External Control Scale

(I-E, Rotter, 1966) in classroom sessions. Ss with scores between 0 and 8 were designated internals; those with scores of 10 and above as externals. As part of the laboratory procedures each S performed on a portable rod-and-frame measure of field dependence. Ss with scores between 0 and 26 were designated field independent, 28 and above as field dependent.

Experimenters

The experimenters were four graduate students in clinical psychology who were employed as research assistants by the senior author.

Procedure

The Ss participated in two sessions of a study described as being concerned with verbal facility. In the first session Ss completed the RAT and performed on a portable rod-and-frame device. The former was administered to help confirm the impression that the experiment concerned verbal facility. The second session consisted of the administration of a specially constructed word list for eliciting associations. The list was derived from a word association test containing double entendre sex words (Galbraith, Hahn, & Liberman, 1968).

The list of 50 words used in the present study included all of the double entendre words from Galbraith's test and a number of non-sexual words drawn from Galbraith's own original list and some additions from the Mental Examiner's Handbook (Wells & Ruesch,

1945). (Table 1 presents the list with each double entendre underlined).

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Insert Table 1 about here

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The word list was arranged in such a way that uncertainty regarding the sexual nature of the word association list steadily diminishes. What begins as a vague suspicion early in the list, becomes unavoidably explicit as the list progresses.

Ss were seated in a small well-lighted laboratory across a table from the experimenter who was surrounded by timing and recording equipment. Approximately one foot behind the experimenter's left shoulder and eight feet from the S was a one-way observation mirror. The task was explained to the Ss as follows:

> Previously, you had to take a verbal test which required mind-wandering, where you had considerable time to respond. This task is going to be quite a contrast. Now you are going to have to be quick and concise. I will read a series of words to you and you are going to have to answer with the first word that comes into your mind. Now, speed will be essential.

A few examples were then given. Timing was accomplished with a Voice Reaction Time instrument and a stop clock calibrated in hundredths of a second. The experimenter triggered the clock by

reading the stimulus word into a microphone. When S responded, the experimenter touched a small circuit breaker which stopped the clock after which he recorded the response latency time. A tape recorder was operated continuously throughout testing so that it was possible to obtain response latencies for any occasion when the equipment failed to operate correctly. The procedure required the experimenter's individed attention so that the likelihood of inadvertantly reinforcing Ss for their types of responses was diminished.

Throughout the testing procedure, S's head and upper torso were videotaped through the one-way glass by a camera with a remote controlled zoom lens. The resulting picture allowed for the observation of a S's face as if he were no more than 3 to 5 feet from the observer.

The major data obtained throughout testing are the following:

1. The first point at which a substantial increase of response time occurs. This measure indicates potential conflict in responding and is a classical index of conflict in word association testing.

2. The occurrence of the first sex response given to a double entendre word. This should indicate that the S feels reasonably confident that the list is deliberately focussed upon sexual content, and he is ready to test out that interpretation.

3. From videotape recordings, two points are of note, one being the first visible reaction to the presence of a double

entendre, the second being a manifestation of an attitude change toward the task.

These latter videotaped data are assumed to be like the "lightbulb effect" used in cartoons to show that a cartoon character has "seen the light." The two points noted above differ in that the "first visible reaction" is more of a "registry of discomfort" or incipient awareness than the latter point, where a change in facial expression, posture, or focus of visual orientation signals a shift in S's way of viewing that task and/or the experimenter.

4. In addition to these gross changes the following social behaviors were observed:

a. Mirth, as indicated by smiles and laughter. Mirth responses denote a distance from the task, and an appreciation of the 'joke' perpetrated by the experimenter;

b. Gestures such as shoulder shrugs, raised eyebrows, and pursed lips suggesting puzzlement. These expressions presumably reflect the fact that Ss recognize the sexual nature of the stimuli but are uncertain as to how they ought to respond.

c. Lastly, general characteristics of Ss such as body weight were observed and rated.

The hypotheses are that the more internal the individual as indicated by I-E and field dependence scores, the more quickly will he recognize the sexual nature of the word association list. Signs of recognition should be evident in an earlier change in response

time; earlier responding with sex words; earlier facial indications of awareness and attitude change; and mirthful types of reactions. Less gestures of confusion should be manifest from internal individuals who also should be thinner than their external counterparts, as suggested by Schachter's work on obesity.

Results

In order to examine response time data the word association list was divided into five segments or periods. Period I, designated the base line period, consisted of the mean response times for the first 12, non-sexual words. Period II consisted of the average response time for the first 4 double entendres, Period III, the second set of 4 entendres, Period IV, the third group of 4 double entendres, and Period V the mean response time to the last 11 consecutive double entendres.

The subject sample for response time data consisted of 48 from the original pool of 65 Ss. This reduction in sample size was done to facilitate the 2x2x5 analysis of variance by creating equal Ns in each cell. Those Ss who were eliminated for this analysis were those who were closest to the medians of one or the other of the two predictor variables, and those whose data was spoiled by equipment failures.

In Table 2, the mean response times and the results from the analysis of variance for the same are presented. Where field dependence seemed irrelevant in this analysis, there is a near

significant interaction between I-E and the period within the word association list.

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Insert Table 2 about here

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It would appear that internal Ss exhibited a marked increase in response time in Period II and that this upward trend continued through Period III. Externals, on the other hand, did not show such a clear increase until Period IV though there was the beginning of such a trend in Period III. Figure 1 is included here to help illustrate this divergence between the internal and external groups.

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Insert Figure 1 about here

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While the obtained curves in Figure 1 amply display the hypothesized differences between internal and external Ss, the variability within the base rate period diminished the potential statistical significance of the interaction term. Consequently another analysis was undertaken wherein Ss received as a score, the number of the first double entendre that elicited a response time equal to or greater than their own 80th percentile of response times given to all 27 of the nonsexual words. In this manner, occasional extreme delays were not as offsetting as they were in the previous analysis. As a precaution, the four groups were

compared for response times at the 80th percentile. No Fs were even equal to 1, so it is safe to assume no significant differences among groups in response times to nonsexual words.

In this analysis a significant main effect for I-E was obtained ($F = 4.79$, $p<.05$) with internals showing an excessive response time earlier than externals. In addition, a near significant interaction was obtained ($F = 2.98$, $p<.10$) which derives from the fact that external-field dependent Ss, the hypothetically most external group, showed their first excessive response time ($M = 5.15$) later than each of the other S groups (I-FD: 2.83; I-FD: 2.42; E-FI: 3.17). Simple effects analyses reveal that this difference was significant beyond the $p<.05$ level in each comparison.

Ss were then compared in terms of response content, and received a score indicating the first double entendre to elicit a nonambiguous sexual response. Scoring procedures were taken directly from Galbraith et al., (1968), two scorers reaching near perfect agreement with a little practice. A rather strong main effect for field dependence was obtained on this measure ($F = 13.22$, $p<.001$). Field dependent Ss did not respond with sexual words until fairly late in the list. A strong interaction term ($F = 8.30$, $p<.001$) derived from the fact that internal-field dependent Ss were particularly late ($M = 16.33$) and internal-field independent Ss were the earliest ($M = 3.08$) to give sexual responses to the double entendres. External-field dependent Ss

also gave sex responses late ($\underline{M}$ = 10.42). Nevertheless, internal-field dependent $\underline{S}$s were significantly later even than that group ($\underline{F}$ = 5.91, $\underline{p}$<.05).

The next set of data to be described was obtained from the video-tape recordings made during the testing session. This data derived from a sample of 54 $\underline{S}$s with an unequal number of $\underline{S}$s in each cell. All analyses of variance, therefore, were of the unweighted means type.

Two distinct points of activity provided the initial focus for analysis. One was referred to as the "first notable change", that is the first double entendre that elicited some response to its sexual content such as eye-rolling, grimaces, jerky hand or body movements, smirks etc. Two raters agreed perfectly on 68.5% of their initial judgments of this first point though the differences between judges were often only of one or two double entendres. Discounting the smaller differences, initial agreement reached 93%. The second measure was that point in the list when $\underline{S}$s manifested some sign of awareness that sexual stimuli were definitely a part of the experiment and not just a random, amusing happenstance. This point was identified by "knowing smiles and looks", in which facial and body mobility suggested a change in attitude toward the task. Speeded up and slow motion playback often helped in locating these points. With close misses discounted initial agreements were obtained in 74% of the judgments. With discussion and subsequent

re-observation by both raters, however, it was possible to reach near complete agreement on both measures.

In Table 3, the means and analyses of variance for these measures are presented. While internals tended to display the first notable change slightly earlier than externals this difference was not significant. However, in regard to manifesting an attitude change toward the task, field independent Ss were significantly quicker than field dependent Ss.

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Insert Table 3 about here

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While there were no significant interactions in these analyses, it is notable that internal-field independent and external-field dependent Ss exhibited the greatest difference in regard to the observed point of attitude change; the former were the earliest and the latter, the last to develop a hypothesis about the nature of the task.

In regard to mirthful responses to the task, a consistent main effect in the favor of internals was found. Internals both smiled ($F = 4.52$, $p<.05$) and laughed ($F = 13.43$, $p<.001$) more often than externals. Field independent Ss tended to smile ($F = 2.98$, $p<.10$) more often than field dependent Ss but this difference failed to reach more than a borderline magnitude and was not borne out in the occurrence of laughter.

A significant interaction was obtained ($F = 4.79$, $p<.05$) with expressions of puzzlement. Internal-field independent Ss exhibited minimal signs of puzzlement ($M = .92$) whereas internal-field dependent Ss manifested the greatest number of these expressions ($M = 4.73$).

Body weight (rated 0 for thin, 1 for medium, and 2 for heavy), likewise, generated a significant interaction ($F= 6.62$, $p <.025$) with internal-field independent Ss being markedly thin ($M = .38$) and external-field independent Ss being heavy ($M = 1.25$). Among field dependent Ss no differences occurred as a function of I-E (I:.55, E:.50).

Discussion

As the data in the result section indicates, support was obtained for the hypotheses. Both locus of control and field dependence contributed to the prediction of awareness development as the double entendre task proceeded. Internals displayed an earlier excessive time delay in responding to the double entendre and the most hypothetically external group, the external-field dependent Ss were the last to exhibit an excessively delayed response. It would seem that the latter group did not "play" with the stimulus words and failed to note potential alternative meanings. Consequently, they proved to be the quickest responders to double entendre stimuli throughout the word list presentation. As suggested in a previous study (Lefcourt & Siegel, 1970a)

externals can respond almost instantly, with little interference from inhibiting mediating processes.

The second point of note was in the tendency of field independent Ss, internals particularly, to test out their developing view about the word association list by responding with a sex word. Here, the field dependence variable provided a sharp dividing line among internals. Field-dependent internals were very slow to respond with sex words, while field independent-internals were very quick to respond in kind to the sexual stimuli. Whether such responses are interpreted as indicators of hypothesis testing as suggested here, or as simple playfulness with what appears to be a humorous situation, the value of differentiating among internals with the field dependence measure is evident.

By itself, field dependence proved to be a better predictor of visible characteristics indicative of changing approaches to the task. Again awareness seemed more characteristic of the field independent person. Why visible information failed to produce the same pattern of results as the time measures with locus of control is not answerable in this study. However, on examination of the data it is evident that internal-field independent Ss were the quickest to exhibit attitude change. While this is not statistically significant the ordering of the groups was consistent with that for the response time data.

In addition to the above observation, internals were found to smile and laugh more throughout the experiment. It should be noted

that laughs and smiles were not of the boisterous kind but were more of a quiet, sniggering sort as if the Ss knew our intentions but were keeping it to themselves. In short, the mirth recorded was of a sort as to indicate some distance or perspective upon the experimental task, or an awareness that his task was "loaded", so to speak.

The puzzlement measure again provided for wide variation among internals as a function of field dependence. This measure was comprised of those expressions which persons seemed to make when they were evaluating their own responses; and in doing so revealed some ambivalence. Perhaps, the gesture of weigning alternatives, holding each hand palm upward catches the flavor of this gesture. Internal-field independent Ss who responded earliest with sex words, appeared least likely to make such gestures whereas internal-field dependent Ss, who were the last to respond with sex words, were most likely to exhibit such gestures. Since internals in general showed early response time delays, the failure of internal-field dependent Ss to respond with a sex word and to exhibit puzzlement may reflect on the way field dependent and field independent internals act upon their cognitions. A tendency to rely upon inner promptings may be more characteristic of the internal-field independent person, who may enjoy greater confidence in his own cognitive abilities. Internal-field dependent persons, on the other hand, may suffer from a relative lack of self-trust since their cognitive abilities may not be as supportive of their

self-conception as they would desire. The fluidity of thought that one might anticipate finding among those in the habit of trusting and consequently acting upon their cognitions is mirrored in the findings of Lefcourt & Telegdi (1971). In that study internal-field independent Ss out-scored all other Ss in the Remote Associates Test, Human movement responses to inkblot tests and other related measures. Internals, then may be described as having been more cognitively alert than externals, and field-independent internals may be said to have been more at ease in testing their hypotheses than their more bewildered field dependent counterparts.

The obtained relationship between weight and the predictor measures provides some bridge between the locus of control work and that of Schachter's regarding obesity. Internal-field independent Ss, those Ss assumed to be most internal, were almost to a man rated as thin. However, it was the external-field independent rather than the external-field dependent Ss who were judged the most heavy in weight.

In view of the more involved internal processes of internal-field independent Ss, one last comparison among groups was made focussing upon the characteristic of "loneliness". If internal-field independent Ss are more "unto themselves", being less persuasible, less stimulus bound, and more distant from ongoing events, then loneliness should be a more common experience for these persons. Included in the word association list was the word "alone" to which several Ss seemed to have difficulty responding.

Long eye movements as well as long response times were commonly observed when Ss considered their response to this word. First, all four groups were compared by a Chi Square for the number of Ss who required an excessive length of time (> 80th percentile) before responding: $\chi^2 = 7.05$, $p<.10$ ($df=3$). Combining groups, field-independent Ss were found to show excessive delay more than field dependent Ss (71% as opposed to 38%, $t=2.32$, $p<.05$). On closer examination it was evident that the largest difference generating this significant effect was within the internal group: 83% of internal-field independent Ss and only 33% of internal-field dependent Ss ($t=2.48$, $p<.05$) exhibited excessive delay in response to the word alone. Externals, on the other hand, did not differ markedly from each other in incidence of delay; 58% of external-field independent Ss and 42% of external field-dependent Ss showed excessive time delays. While these results are not definitive, it would seem that the problem of loneliness may be particularly relevant to the more self-monitoring and aware internal-field independent persons.

Overall, the present investigation provides support for the previously hypothesized but weakly tested assumption regarding cognitive processes and locus of control. In addition, the nomological network including cognitive activity, resistance to persuasion and the maintenance of autonomy associated with an internal locus of control is strengthened. Again, too, the value of using two theoretically congruent measures of internality such

is the I-E scale and field dependence seems self evident. Without the field dependence measure, many of the obtained results would not have been observed though possible meanings to be inferred from specific types of incongruence are only in the early stages of conjecture.

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Table 1

Stimulus Words in the Double Entendre Word Association List

1 fly	11 light	21 sugar	31 measure	41 HUMP
2 face	12 work	22 NUTS	32 BLOW	42 PET
3 plant	13 RUBBER	23 cross	33 garden	43 TOOL
4 voice	14 health	24 MAKE	34 COCK	44 SUCK
5 earth	15 ocean	25 carpet	35 stove	45 BANG
6 miss	16 BUST	26 CRACK	36 MOUNT	46 ASS
7 door	17 fire	27 lamp	37 city	47 BALLS
8 alone	18 watch	28 SCREW	38 QUEER	48 PUSSY
9 good	19 SNATCH	29 paper	39 water	49 BOX
10 ride	20 drink	30 PRICK	40 PIECE	50 LAY

Table 2

Means and Standard Deviation of Response Times as a Function of Internal-External Control (I-E), Field Dependence (FD) and Periods (Per) and Analysis of Variance Results

Groups		Per I	Per II	Per III	Per IV	Per V
Internal						
Field Independent	M	201	2235	258	240	240
	SD	79	100	110	126	70
Field Dependent	M	224	254	281	261	281
	SD	86	100	67	95	93
External						
Field Independent	M	213	208	239	274	267
	SD	48	51	42	69	69
Field Dependent	M	204	208	239	274	267
	SD	79	60	49	61	111

F(I-E) = 1.47; F(FD) = .00; F (Per) = 12.12, $p<.001$;

F(I-E x Per) = 2.10; $p<.10$; F(FD x Per) = .36;

F(I-E x FD x Per) = .63

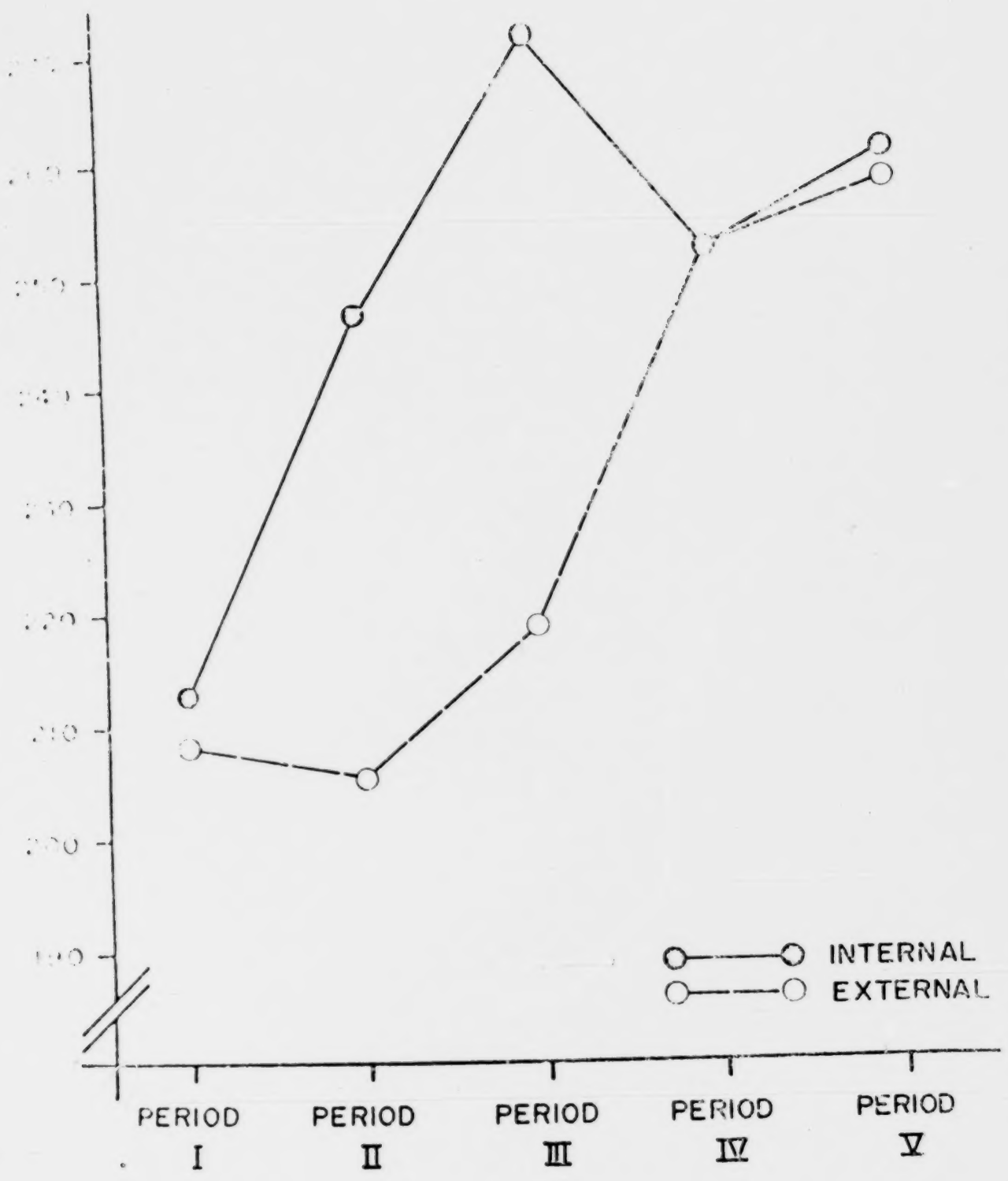
Table 3

Means and Analyses of Variance for the First Notable Change, Attitude Change to Task as a Function of Internal-External Control (I-E) and Field Dependence (FD)

	Internal		External		Anova		
	FI	FD	FI	FD	F(I-E)	F(FD)	F(I-ExFD)
Dependent Variables	(N=13)	(N=11)	(N=12)	(N=18)			
First Change M=	1.92	1.91	2.42	2.67	2.58	.13	.06
SD	.49	.83	1.56	1.94			
Attitude Change M	3.69	5.64	4.58	6.06	.86	5.86	.12
SD	1.32	2.11	2.39	3.42		p<.05	

Figure Captions

Response Time During Five Periods of Word Association as a Function of Locus of Control


INTERNAL
EXTERNAL
PERIOD I
PERIOD II
PERIOD III
PERIOD IV
PERIOD V